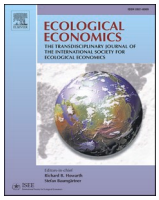
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Ecological Economics 192 (2022) 107259

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon



ANALYSIS

Substitution of social sustainability concerns under the Covid-19 pandemic

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ARTICLE INFO

JEL classification:
L3
D64
Q54
I3
D9

Keywords:
Charitable donation
Covid-19 pandemic
Climate crisis
Poverty
Substitution of social concerns

ABSTRACT

Think tanks and political leaders have raised concerns about the implications that the Covid-19 response and reconstruction might have on other social objectives that were setting the international agenda before the Covid-19 pandemic. We present evidence for eight consecutive weeks during April–May 2020 for Austria, testing the extent to which Covid-19 concerns substitute other social concerns such as the climate crisis or the protection of vulnerable sectors of the society. We measure behavior in a simple donation task where participants receive €3 that they can distribute between themselves and a list of charitable organizations, which vary between treatments. We consider initially a list of eight charities, including a broad set of social concerns. Results show that introducing the *WHO Covid-19 Solidarity Response Fund* significantly reduces the sum of donations to the original eight charities. This derives from two effects: First, introducing the *Covid-19 Solidarity Response Fund* does not significantly change aggregate donations. Second, results point to a high support to the *WHO* Covid-19 Fund. Overall, our results indicate that donations to diverse social concerns are partially substituted by donations to the Covid-19 fund; yet, this substitution does not fully replace all other social concerns. Results are robust to a 10-fold increase in endowment, with decisions made over €30.

1. Introduction

The Covid-19 pandemic is a dramatic event: As of August 25th, 2021, there are more than 212 million confirmed cases worldwide with over 4 million confirmed deaths due to the disease (see the Statistics by the World Health Organization (*WHO*), https://bit.ly/3gRoK9w). These dramatic figures still fall short to illustrate the spread of suffering that the disease has brought: in addition to mortality, morbidity from milder cases, long-term side effects, the economic struggle for citizens around the world losing their income, and the difficulty of access to basic needs such as education or regular health care. The projections of the impact of the Covid-19 pandemic show the potential for enormous economic losses (Guan et al., 2020), severe implications in all *Sustainable Development Goals*, and an unprecedented negative change in the *Human Development Index* since 1990 (United Nations, 2020).

Despite the dramatic effects driven by Covid-19, there are a collection of other pressing social issues affecting human and planetary well-being. Scientists, supranational agencies, governments, charities, and numerous citizens around the world were devoting attention, effort, and financial resources to a wide set of pre-covid social priorities (Thorp, 2020). The United Nations' (*UN*) *Sustainable Development Goals* are a prime example of an ambitious initiative to transform the world by means of *"promoting prosperity while protecting the planet"* (United Nations, 2020). The 17 goals embrace environmental conservation, health, poverty alleviation and economic prosperity to achieve a more sustainable future for all. Mobility, waste management, climate mitigation, reducing plastic in oceans or reforestation are some of the calls for action included in this program. These illustrate the relevance of the overarching pre-Covid-19 social objective of fighting the climate crises and promoting environmental conservation and the *interrelation* with other social objectives. Environmental protection is not understood as an isolated policy agenda but rather as part of the sustainability vision to transform societies. Scientists keep warning against the dramatic consequences from global warming, destruction of ecosystems and species extinction, and underlined the vastly insufficient action that has been taken so far to mitigate the climate emergency (e.g. Hagedorn et al., 2019; Ripple et al., 2019). The increasing emergence of infectious diseases is among one of the many threats to be expected from climate change and environmental degradation. Research from the natural sciences has established a clear link between deforestation and changes in land-use (with the associated losses of biodiversity, ecosystems and wildlife habitats), and the likelihood of future zoonotic outbreaks and

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https://doi.org/10.1016/j.ecolecon.2021.107259
Received 2 December 2020; Received in revised form 30 August 2021; Accepted 11 October 2021
Available online 26 October 2021

epidemics (see, e.g. Patz et al., 2004; Jones et al., 2008; Keesing et al., 2010; Kilpatrick and Randolph, 2012; Dinerstein et al., 2020; Morand and Lajaunie, 2021). Many of the recent disease outbreaks (AIDS, SARS, Ebola and the most recent coronavirus SARS-CoV-2) have been likely transmitted through zonooses (e.g. Jones et al., 2008; Ye et al., 2020; Shereen et al., 2020; Zhang and Holmes, 2020). For example, Faust et al. (2018) demonstrate that the highest risk of disease spill-over exists at intermediate levels of habitat loss, while the rarest but also largest epidemics occur at extreme rates of land loss. This is alarming, given that recent estimates suggest that only about 3% of terrestrial surface qualify as fully intact ecosystems (Plumptre et al., 2021). Investments to reduce the current rates of deforestation (e.g. through payments for ecosystem services) would likely result in large returns, even if only considering the reduced likelihood of future virus emergence (Dobson et al., 2020).

Similarly, the link between poverty, health and the earth's climate suggests that investments to alleviate poverty can have substantial positive impacts on environmental conservation efforts (see e.g. Tol, 2020), which in turn would suggest a decrease in the likelihood of infectious disease emergence. For example, recent evidence suggests that conditional cash transfer programs, aimed at reducing poverty, can lead to a reduction in deforestation as a side-effect (see Ferraro and Simorangkir, 2020). In addition, environmental policy is increasingly considering the poverty implications of environmental degradation. Developing countries, especially the least developed countries that have contributed least to climate change, are most vulnerable to its adverse impacts and also least able to adapt to it (see e.g. Füssel, 2010; Bathiany et al., 2018; Ravindranath and Sathaye, 2002; IPCC Report, 2001). Human induced global warming is estimated to further increase global economic inequality, leaving poorer countries worse off relative to scenarios without climate change (e.g. Diffenbaugh and Burke, 2019; Burke et al., 2015). Further, evidence suggests that these countries already experience the greatest health burden associated to increases in climate-sensitive diseases (Patz et al., 2007).

In sum, the Covid-19 pandemic, mitigating climate change and alleviating poverty constitute interconnected, large-scale collective action problems (Jagers et al., 2020; Harring et al., 2021). While this interrelation of the Covid-19 pandemic with environmental degradation and poverty has been scientifically established (see also the "Covid-19 Response" to each of the *UN Sustainable Development Goals*; United Nations, 2020), it might be difficult to perceive for citizens. This can translate into considering Covid-19 as an emergency *independent* of other social concerns, displacing the interest and actions of supranational agencies, national governments, charities, and citizens (Hodges and Jackson, 2020; Naidoo and Fisher, 2020). This substitution of social priorities, focusing on the Covid-19 pandemic at the expense of other social causes, has been a worry expressed recurrently since the Spring of 2020 by Think Tanks and political leaders. For example, the *Club of Rome* (The Club of Rome, 2020), political leaders such as those of the European Union (*EU*), and scientists (see, e.g., Rosenbloom and Markard, 2020) have raised the concern that the Covid-19 response and recovery could have a considerable impact on the mitigation of the climate crisis. Similarly, there have been worries about the continuation of the *Intergovernmental Panel on Climate Change* (*IPCC*) report (Tollefson, 2020). In addition, Mahler et al. (2020) estimate that the Covid-19 pandemic might push about 40–60 million people into extreme poverty. Similarly, a common concern is that the pandemic might induce a financial crisis amplifying inequality and severe poverty (Braun et al., 2020).

This study presents initial evidence on the substitution that concerns regarding the Covid-19 pandemic might have on other social priorities by means of real-life donations to charities. These results respond to the call by the scientific community for economists to contribute to the understanding of the behavioral effects of the Covid-19 pandemic (Coyle, 0150), contributing to the efforts by the economics discipline to generate cumulative evidence aiding policy-making (see https://bit.ly/3jmBZk3).

We collected donations using an online experiment with 1,113 participants, starting on April 4, 2020 (week 1) on one day per week for eight consecutive weeks. We present results from a simple donation task where subjects are endowed with €3 that can be distributed between themselves and a list of charitable organizations which vary between treatments. In a *Baseline* setting, possible recipients are a list of eight charities representing diverse social concerns, including environment, health and poverty. To measure potential substitution effects in donations between the various social concerns in the light of the Covid-19 pandemic, in a *Covid-19* treatment we include the *COVID-19 Solidarity Response Fund for WHO* (*WHO Covid-19 Fund*) in addition to these eight charities as a possible recipient for donations (for details about the fund, please refer to https://covid19responsefund.org.) Finally, in a *Covid-19 Only* treatment we include only the *WHO Covid-19 Fund* as a possible recipient. After the donation task, participants answer an extensive questionnaire including questions on risk perceptions, actions, and motivations related to the Covid-19 pandemic, the climate crisis, and poverty. This allows us to explore to which extent subjects' (i) risk perceptions, (ii) actions and (iii) motives on the Covid-19 pandemic, climate crisis and poverty alleviation are correlated. Moreover, it allows us to explore the relevance of these items in defining the pro-social orientation of subjects, as measured in their donation decisions.

This study contributes to ongoing projects specifically monitoring the Covid-19 pandemic impact on charitable organizations (see for example https://bit.ly/3n1IJpQ and https://bit.ly/3cUQj12 listed at the Economics Observatory). Similarly, it relates to recent studies addressing how experience with the Covid-19 pandemic (Branas-Garza et al., 2020; Shachat et al., 2020) or information policies on the Covid-19 affect people's pro-social behavior and pro-conservation policy support (Abel and W. Brown, 2020; Abel et al., 2020; Guo et al., 2020; Shreedhar and Mourato, 2020). More broadly, it contributes to the literature improving our understanding of the interconnections between the Covid-19 pandemic, economic well-being and environmental conservation (see, e.g. Dobson et al., 2020; Goldthau and Hughes, 0249).[1]

The remainder of this study is structured as follows. Section 2 discusses the experimental design and procedures jointly with the behavioral conjectures and related literature. The presentation of results in Section 3.1 is then organized around two subsections, focusing first the on substitution effects, and followed by the analysis of risk perceptions, actions, and motivations regarding Covid-19, climate change, and poverty alleviation. Section 4 serves as a discussion and conclusion on the implications of our results.

2. Experimental design

2.1. Decision setting

Each of the main treatments consisted of a donation-to-charity task, similar to Eckel and Grossman (2003) and Eckel et al. (2005), followed by an extensive questionnaire. In the donation task, subjects were endowed with €3 to be distributed among themselves and various charitable organizations. The list of available charities varied between treatments. In a robustness set of high stakes treatments, subjects had €30 to distribute between themselves and the charitable organizations.

In the *Baseline* treatment, the list of charitable organizations were *World Wide Fund for Nature* (*WWF*), *Doctors Without Borders* (*MSF*), *Amnesty International* (*AI*), *SOS Kinderdorf* (*SOS*), *Caritas* (*CAR*), *Licht ins Dunkel* (*LID*), *Oxfam* (*OXF*), and the *Red Cross* (*RC*). This list was chosen to reflect a broad range of social concerns, with a focus on three broad categories; environment (*WWF*), poverty (*AI*, *SOS*, *CAR*, *LID*, *OXF*) and

[1] Our study further contributes to a large body of literature on the behavioral drivers of charitable donations (see, e.g., Andreoni, 1990; Vesterlund, 2003; Frey and Meier, 2004; Bénabou and Tirole, 2006; Ariely et al., 2009; Gneezy et al., 2014; Garcia et al., 2020).

health (*MSF*, *RC*). In the *Covid-19* treatment, the *Covid-19 Solidarity Response Fund for WHO* was added to the list of charitable organizations used in *Baseline*, for a total of nine charities. In *Covid-19 Only*, the *WHO Covid-19 Fund* was the only available recipient. In all treatments the decision screen included the mission statement of each of the charities.

In the *Baseline* and *Covid-19* treatments, participants could distribute their endowment across multiple charities, if any, and themselves. In *Covid-19 Only*, participants decided between themselves and the *WHO Covid-19 Fund* only. In all treatments, donations were matched at a rate of 25%, which entailed that we donated to the charity an additional 25% from all donations made by participants. This mechanism ensures that it is socially efficient for the participants to make donations via the donation task that we offer, as opposed to keeping the full endowment themselves and making donations to their preferred charities outside of the online experiment. The individual earnings of the experiment are defined by the amount of the €3 (€30 for high stakes) that subjects kept for themselves. The instructions of the experiment are presented in Section A of the Supplementary Material.

After completing the donation task, subjects answered a 15 minutes questionnaire that included three separate blocks of questions, the first about the Covid-19 pandemic, the second about the climate crisis, and a third about poverty alleviation. For each of those we included sets of statements on participants' behavior, perceptions, and motivations to which participants would state their agreement in a 5-Point Likert scale. For example, questions about risk perceptions regarding Covid-19 point to the fears of infection for oneself and others, or other disruptions in daily life. Question on actions refer to wearing a mask in public and washing hands regularly, among others. And questions on motives refer to internal motivations for following hygienic measures, as well as pressure from social norms or government monitoring. Similarly, risk perceptions about climate change refer to the fear of climate-related events affecting subjects' daily life, actions refer to mobility, eating habits, recycling and compensation of CO2, and motives refer to self-identification with care for sustainability, biodiversity conservation, social norms, and self-interest motives. Similar comments apply to poverty (see section B of the Supplementary Material for the list of questions in the questionnaire).

2.2. Procedures

Participants were recruited from the student subject pool of the University of Innsbruck using *hroot* (Bock et al., 2014) and with the experiments implemented in *LimeSurvey* (LimeSurvey et al., 2020). Subjects only participated in one of the treatment conditions in a between-subjects design and could only participate once. Upon receiving the invitation, subjects were informed that this was an online experiment that would last approximately 20 minutes. Payment options were transactions via PayPal or Amazon vouchers.

We started collecting data on April 4th 2020 for a total of eight consecutive weeks. For each date at which data was collected, invitations were made for three identical, simultaneously running sessions, one for each of the treatment conditions. Subjects who registered for the experiment were randomly allocated to one of the three sessions. Subjects were told that they could participate in the experiment as soon as they received the link which was distributed at 10*am*, and that participation was possible until 8*pm* on the same day. After 8*pm* the experimental sessions would be closed and the links deactivated.

At the end of each experimental session, the sum of donations across all treatments was transferred to each of the organizations via bank transfers. A depersonalized summary of all individual donations as well as the total amount of money paid to each organization was made available on the website of the corresponding author after each experimental session. The payment to participants was transferred within three working days by one of the co-authors.

Each session included up to 40 participants, leading to a total number of 879 subjects in three main treatments (*Baseline*: $n = 294$; *Covid-19*: $n = 291$; and *Covid-19 Only*: $n = 294$). In addition, in week 2, we conducted a series of robustness tests, including a 10 fold increase in endowments, with subjects making decisions over €30 ($n = 110$) and variations in the experimental design ($n = 124$). These robustness tests were designed to test the extent to which specific aspects of the experimental design were critical for the stability of the treatment effects reported. For example, the high stakes sessions were designed to test whether the treatment effects for decisions over a total of €3 (for the main treatments) would also be identified on decisions based on a much larger endowment of €30. This is a common approach to address the criticism that economic experiments tend to use lower stake sizes than those in real life (see this approach applied for example in, Basurto et al., 2016). The average earnings of participants were €1.01 ($sd = €1.14$) in the main treatments, €12.15 ($sd = €10.79$) in the high stakes treatments, and €1.19 ($sd = €1.21$) in the replication treatments.

Participants were students at the University of Innsbruck, Tyrol (Austria). Tyrol was the region worst affected by the Covid-19 pandemic in Austria, bordering the North of Italy and the South of Germany. The region reported the first cases on February 25, 2020 and entered a lock-down of all municipalities in the region for about seven weeks on March 16, 2020. Between end of March and mid April, there were roughly 2,000 active Covid-19 cases and by the end of the data collection on May 28, 2020 there had been a cumulative of 3,546 cases in a region with roughly 750,000 inhabitants. The data collection started one week before the lock-down of Tyrol lifted, on April 14th 2020. This entailed that people could go out of the house for a walk, a run, or cycling only accompanied with others inhabiting the same household and maintaining social distance. After the lock-down, people could as well start moving across municipalities in Tyrol. By the end of the data collection on May 28, 2020, a mask was mandatory in indoor public spaces, and most aspects of daily live were in a "new normality" scenario (open schools, shops, restaurants and bars with accompanying safety regulation). Thus, the eight weeks of data collection comprised a time where the Covid-19 pandemic was highly relevant in subjects' daily life, the media, and government policy.

2.3. Behavioral conjectures and related literature

We build our main hypotheses on the academic and policy worries shared at the onset of the Covid-19 pandemic, referring to the pandemic substituting previously relevant social concerns.

Conjecture 1. *The Covid-19 pandemic substitutes other social concerns.*

Our experimental design measures the substitution effect in two aspects: a variation in the number of charities requesting for funds (from eight in *Baseline* to nine in *Covid-19*) and the topic of the novel charity being the Covid-19 pandemic. In particular, requesting for funds to support the World Health Organization in leading and coordinating the global effort, supporting countries to prevent, detect, and respond to the pandemic. Thus, we do not isolate the part of the substitution effect from the pandemic deriving from the emergence of a new request for fund and from the topic of such request and rather measure a combined effect of the two.

This is similar to the results reported for previous crises where an additional request for funding is combined with a specific topic for the funds. Previous empirical literature on the effect of crises on charitable donations using donation statistics do not find substitution of the crises to other unrelated causes. S. Brown et al. (2012) show that unexpected donations of households after the 2004 Indian Ocean tsunami were positively correlated with planned (future) donations towards other social causes. Scharf et al. (2017) find that fundraising interventions associated with a natural or human disaster lift donations to charities related to the disaster, and donations to other (unrelated) charities for a short time but decline shortly thereafter, leading to no changes in baseline donation levels to the other charities in the longer time horizon. And more recently Deryugina and Marx (2020) present strong evidence

that an exogenous increase in demand for giving (due to tornadoes) does not reduce donations to other local charities. Thus, Deryugina and Marx (2020) conclude that "giving to one cause need not come at the expense of another."

Experimental studies have investigated the effect of increasing the request for funds charities by varying the number of possible recipients in decision tasks (see, e.g., Gee and Meer, 2020; Deryugina and Marx, 2020, for discussions). The general empirical result is that increasing the number of charities increases aggregate donation amounts. This is at odds with theory models supporting that the supply of donations of an individual is a fixed amount independent on the number of requests for donations (see mental accounting theory from Tversky and Kahneman (1981), Kahneman and Tversky (1984), Thaler (1985, 1999) or the "altruism budget" from Gee and Meer (2020)). Lab experiments are presenting piling evidence that an increase in the number of potential recipients increases total donations (Schmitz, 2021; Soyer and Hogarth, 2011). Schmitz (2021) increases the list of charities from one single charity up to three and finds a weak substitution with more recipients but no changes in the overall donation amount. Soyer and Hogarth (2011) investigate competition among charities with up to 16 possible recipients. They show that the total amount of donations increases with more recipients but at a decreasing rate. There is also field evidence pointing in the same direction: A solicitation of volunteering by two charities results in increased time donations to each charity as compared to people solicited by a single charity to volunteer (Lange and Stocking, 2012). Lange and Stocking (2012) also show that subjects solicited to volunteer by two charities gave higher total monetary donations to the sum of charities than they gave when they were solicited by only one charity.

Thus, if the results from this previous literature were extrapolated to our experimental design, the substitution effect that we report would be a lower-bound estimate of the pure substitution effect associated to the Covid-19 pandemic being the topic of the request for additional donations. The increase in the number of possible recipients would be driving the total donations upwards, the Covid-19 focus of the funding request would be driving donations to the eight original charities downwards, and the aggregate substitution reported would be a conservative lower-bound estimate.

The second conjecture stems on evidence from literature on intrinsic motivations and perceptual reactions for charitable giving (Sargeant, 1999).

Conjecture 2. *Donations correlate with risk perceptions, actions, and motives on the Covid-19 pandemic, the climate crisis and poverty, at the individual level.*

The focus on risk perceptions derives from studies on pro-environmental actions and behavior that specifically investigate the influence of climate risk perception as a major driver for environmentally friendly behavior (Adger et al., 2009; Grothmann and Patt, 2005; Tam and McDaniels, 2013). More specifically, climate risk perceptions are directly affected by experience of extreme weather events (Spence et al., 2011; Carlton et al., 2016). This leads to people being more concerned about climate change (Weber, 2006) and the higher the concern for the environment, the higher is the engagement in pro-environmental actions (Markowitz et al., 2012; O'Connor et al., 1999; Eom et al., 2016). Similar findings have been provided for infectious diseases. For the swine flu, perceived risk and perceived severity of the disease were found to be crucial predictors of protective behavior (see for example Bish and Michie (2010) or Ibuka et al. (2010)). After the design of our study, these findings have been replicated for the Covid-19 pandemic: Risk perception regarding the pandemic (Dryhurst et al., 2020; Wise et al., 2020) and fear (Harper et al., 2020) are correlated with the adaption of preventive health measures.

At the time this research started, we also wanted to explore the correlation of self-reported actions on climate change, the Covid-19 pandemic and pro-poor with pro-social behavior measured through the donation task. This was intended as a mainly exploratory exercise, given the limited previous literature. There was previous evidence showing a reinforcement effect on charitable donations from recalling individual's past pro-social behavior (e.g. Young et al., 2012). This is different from our approach, as we ask for actions on the three domains *after* the donation task. There was also evidence showing a stability of pro-environmental behavior, driven by an 'environmental self-identity', whereby past pro-environmental behavior positively correlates with future pro-environmental behavior (Van der Werff et al., 2014). To the best of our knowledge, however, the link between past actions on a given topic and charitable donation behavior had not been clearly established by the time this study was designed. By now, there is recent evidence supporting the link between actions related to the Covid-19 pandemic and pro-sociality. The closest study is Campos-Mercade et al. (2021), showing in an incentivized experiment that pro-social individuals are more likely to comply with the Covid-19 social rules, such as following physical distancing guidelines, staying home when sick, and buying face masks. The authors conclude that the impact of policies on a population may depend on the degree of pro-sociality. Other recent literature has analyzed the time stability of pro-social behavior during the pandemic in adolescents (Van de Groep et al., 2020), the role of perceptions of future consequences, consideration of others and compliance with the precautionary measure, in the decisions in a social dilemma (Hulsen et al., 2021), and the influence of others' behavior during the pandemic in own donations to the Centers for Disease Control and Prevention Emergency Fund (Abel and W. Brown, 2020).

Lastly, the relevance of motives and social concerns derives from a broad literature in behavioral economics explaining other-regarding preferences and behavior opposed to selfishness (for a survey, see Fehr and Schmidt, 2003). The early literature suggests two main approaches for such human behavior: the first approach assumes that people have pro-social preferences, meaning that people do not only care about their own utility but also take others' utility into account. Prominent work has been done in this direction, such as the fairness theories that incorporate inequality aversion by individuals (Bolton and Ockenfels, 2000; Fehr and Schmidt, 1999). The second approach focuses on reciprocity, meaning that people act in a more cooperative manner in response to the friendly behavior of others and act in a hostile way when treated in an unfriendly way by others. A large number of laboratory experiments have been devoted to the study of reciprocity in economics (see the survey in, e.g. Fehr and Gächter, 2000; Falk and Fischbacher, 2001). More recently, Bénabou and Tirole (2006) present a unifying theoretical approach on pro-social behavior and incentives. The key property of their model is that agents' pro-social or anti-social behavior is composed of an endogenous and unobservable mix of three motivations: intrinsic, extrinsic, and reputational, which must be inferred from their choices and the context of decision-making. This is the framework that we used to develop our questionnaire about motives for action and concern about the climate crisis, the pandemic and pro-poor action. There is piling experimental evidence of the relevance of these different motives and its relation to the context of decision making. Gneezy et al. (2011) review the empirical evidence on how extrinsic incentives interact with other motivations for action. We provide additional evidence on the correlation of motives and pro-social behavior as measured in the donation task.

3. Results

3.1. Results on substitution effects

In the treatment where participants can donate to the menu of eight charitable organizations (*Baseline*), all eight charities receive positive donations on average, with values ranging from €0.09 ($sd = €0.29$) for *Caritas* (*CAR*) to €0.56 ($sd = €0.58$) for *Doctors Without Borders* (*MSF*) (see Fig. 1). Thus, participants' donation behaviour in *Baseline* embraces a diversity of social concerns. The average aggregate donation in

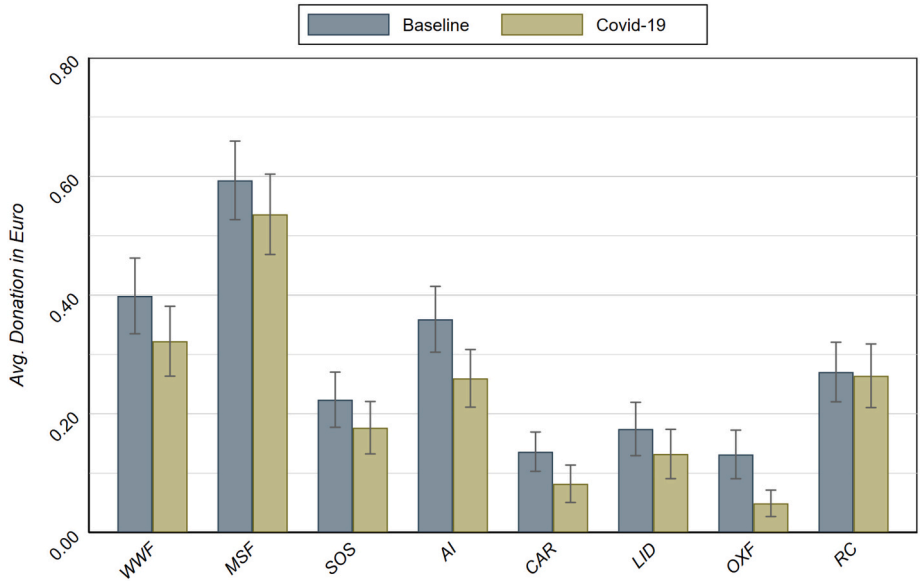

Fig. 1. Average donations in € in the *Baseline* and the *Covid-19* treatment, separated for the eight charities. Error bars indicate 95% confidence intervals.

Baseline is €2.29 ($sd = €1.08$; 76.3% of the endowment; see Fig. 2). Once the *WHO Covid-19 Fund* is present in the menu of recipients (*Covid-19* treatment), donations to the original 8 charities are significantly lower (see "Sum" in Fig. 2b). More specifically, in the *Covid-19* treatment, the mean donation to the eight charities is €1.82 ($sd = €1.07$; 60.8% of the endowment) which is significantly lower to mean donations in *Baseline* ($t(584) = 5.868$, $p < 0.001$, $n = 585$). Therefore, introducing the *COVID-19 Solidarity Response Fund for WHO* significantly reduces the sum of donations to other social causes.

Separately considering the effect for each of the charities, we see a substitution effect for all (see the negative coefficients in Fig. 2b). For *WWF* we observe a significant decrease of 19.1% ($t(584) = 2.039$, $p = 0.042$, $n = 585$) in the donations received in the *Covid-19* treatment as compared to the *Baseline*. This is roughly at the middle range of values of the substitution magnitude. We identify a significant substitution effect with larger coefficients for *AI* ($t(584) = 2.469$, $p = 0.014$), *CAR* ($t(584) = 2.830$, $p = 0.005$) and *OXF* ($t(584) = 3.377$, $p = 0.001$; with $n = 585$ in all tests). The substitution effect for the other charities is not significant. Looking at the differences on how donation levels across the different charities are affected by the presence of the *WHO Covid-19 Fund*, we only identify a stronger reduction in donations for *Oxfam* as compared to the reduction in donations for *Doctors Without Borders* ($\chi^2(1) = 5.066$, $p = 0.024$) and the *Red Cross* ($\chi^2(1) = 6.496$, $p = 0.011$). The two health charities, *Doctors Without Borders* and *Red Cross*, are actually those with the smallest coefficients for the substitution effect. There is generally a similar decrease in donations for all other charities from introducing a specific Covid-19 response and relief charity. Thus, we do not find support for the *WWF* being outstandingly substituted away by the requests for funds from the *WHO Covid-19 Fund*.

Lastly, despite the positive donations to the *WHO Covid-19 Fund* in the *Covid-19* treatment (€0.28; $sd = €0.49$; 9.5% of the endowment), the aggregate level of donations does not increase with the presence of this additional charity. Indeed, aggregate donations to the full set of nine charities slightly decrease to €2.11 ($sd = €1.12$; 70.2% of the endowment), as compared to the *Baseline* treatment, with the difference not being statistically significant ($t(584) = 1.938$, $p = 0.053$, $n = 585$) (see Fig. 2a).

In the treatment where participants could only donate to the *WHO Covid-19 Fund* (*Covid-19 Only*), we see average aggregate donations of €1.56 ($sd = €1.10$) (52.2% of the endowment; see Fig. 2a). Since these donations are devoted exclusively to the *WHO Covid-19 Fund*, this shows a high degree of interest among participants in the response and recovery to the Covid-19 pandemic. The average aggregate donations are significantly lower than the average aggregate donations in *Covid-19* where participants can split donations across the original list of charitable organizations, the *WHO Covid-19 Fund* and themselves ($t(584) = 5.631$, $p < 0.001$, $n = 585$). In addition, when the *WHO Covid-19 Fund* is one among several social causes (treatment *Covid-19*), donations to the fund go down to €0.28 ($sd = €0.49$; 9.5% of the endowment), being significantly lower than donations in *Covid-19 Only* ($t(584) = 13.756$, $p < 0.001$, $n = 585$). This suggests that while subjects care about the Covid-19 pandemic, they also care about other social concerns and distribute donations among several charities accordingly, when given the chance.

Based on a robustness test conducted in week 2 with a smaller sample size ($n = 110$), all treatment results are robust to a 10-fold increase in the endowment to €30. Increasing the endowment increases aggregate donation and decreases percentage donations from the endowment, but does not significantly affect treatment differences reported in this section (see Section D in the Supplementary Material).

Lastly, we explore the short term time evolution of total donations during the eight weeks of data collection (see Fig. 3). The evolution over time does not significantly differ between treatments and there is no monotonic time trend in the data during the period of 8 weeks that we study. We observe some variation over time, with the level of donations across the different treatments being correlated (see Fig. 3). A Tobit regression of total donations on treatment indicators, time, and the interaction terms thereof suggests that the evolution over time does not significantly differ between treatments (*Covid-19* × *Time*: $t(874) = 0.194$, $p = 0.846$; *Covid-19 Only* × *Time*: $t(784) = 0.369$; $p = 0.712$; $n = 879$). The (Spearman) correlations between mean donations (per date at which data has been collected) and treatments are high and statistically significant (*Baseline* vs. *Covid-19*: $\rho_S = 0.905$, $p = 0.002$; *Covid-19* vs. *Covid-19 Only*: $\rho_S = 0.810$, $p = 0.015$; $n = 8$).

3.2. Results on risk perceptions, actions, and motivations

In this section we relate the data on participants' donations to their self-reported behavior, perceptions, and motivations from the questionnaire. All single survey items are z-standardized after reverse-scoring survey responses to inversely framed questions (across all three treatments in the main experiment). The measures used in the analyses are constructed as the sum of the z-standardized responses of the items belonging to the particular inventory; this measure is finally z-

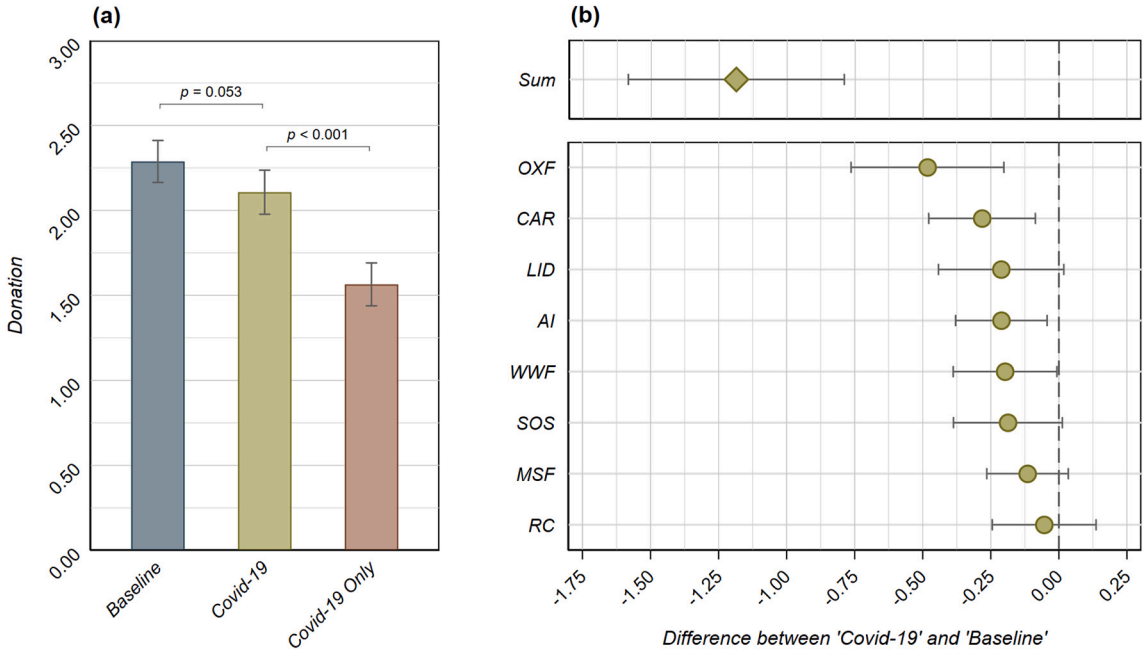

Fig. 2. (a) Average donations (pooled across charities) per treatment in €. *p*-values are based on Tobit regressions with €0 and €3 as the lower and upper limit, respectively (endowment €3), and robust standard errors. (b) Point estimates and 95% confidence intervals (based on robust standard errors) of the differences in donations to the eight charities between the *Baseline* and the *Covid-19* treatment, based on Tobit regressions of the amount donated to the respective charitable organization on a treatment indicator for the *Covid-19* treatment (with €0 and €3 as the lower and upper limit, respectively, and robust standard errors). Negative values represent lower donations in the *Covid-19* treatment than the *Baseline* treatment. All pairwise comparisons between coefficients based on Wald tests after seemingly unrelated regressions (with robust standard errors) are insignificant, except for *OXF–MSF* ($\chi^2(1) = 5.066$, $p = 0.024$) and *OXF–RC* ($\chi^2(1) = 6.496$, $p = 0.011$). The estimate at the bottom indicates the difference in the sum of donations to the eight charitable organizations between the *Baseline* and the *Covid-19* treatment ($p < 0.001$).

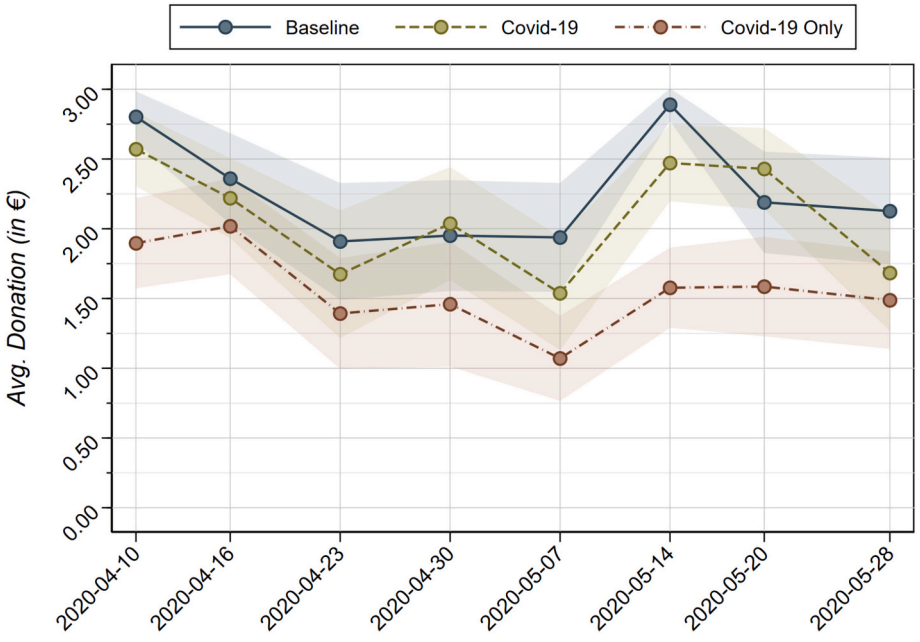

Fig. 3. Evolution of average donations in € (pooled across charities) per treatment over the eight consecutive weeks of data collection. Shaded areas indicate 95% confidence intervals. The differences (based on Tobit regressions of total donations on a treatment indicator, with €0 and €3 as the lower and upper limit, respectively, and robust standard errors) between treatments *Baseline* and *Covid-19* are insignificant for each date, except for 2020-05-14 ($t(84) = 2.192$, $p = 0.031$). The differences between treatments *Covid-19* and *Covid-19 Only* are statistically significant on three dates: 2020-04-10 ($t(74) = 3.191$, $p = 0.002$), 2020-05-14 ($t(88) = 4.325$, $p < 0.001$), and 2020-05-20 ($t(69) = 3.307$, $p = 0.001$).

standardized again, such that all measures used in the analyses have a mean of zero and a standard deviation of one.

We first look into the correlation of subjects' self-reported responses on (i) risk perceptions, (ii) actions, and (iii) motives across the three big topics of the Covid-19 pandemic, the climate crisis, and poverty alleviation, respectively. The correlation coefficients are tabulated in Table 1. We generally observe positive and highly significant correlations for (i)–(iii) across all three big topics. The magnitude of the coefficients for motives are the largest, with values ranging between 0.43 (Covid-10 and climate crisis) and 0.61 (climate crisis and poverty). For the rest we see smaller coefficients, ranging from about 0.2 to about 0.4. This points to individuals that are concerned and take action about the climate crisis being individuals that are also concerned and take action about the Covid-19 pandemic and poverty alleviation. This seems to be driven

Table 1
Pearson correlations for participants' survey responses between Covid-19, climate crisis, and poverty alleviation for (i) risk perceptions, (ii) actions, and (iii) motives. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

	(i) Risk perceptions		(ii) Actions		(iii) Motives	
	Covid-19	*Climate Crisis*	*Covid-19*	*Climate Crisis*	*Covid-19*	*Climate Crisis*
Climate Crisis	0.259**		0.278**		0.434**	
Poverty Alleviation	0.217**	0.340**	0.205**	0.434**	0.466**	0.612**

from the motivation of subjects towards action being common to these three big topics.[2]

Turning now to the influence of these items on donations, we observe that risk perceptions on the Covid-19 pandemic significantly affect aggregate donations (see Table 2, column 1). When considering separately the perception of risk associated with the other two topics, risks perceptions regarding the climate crisis are also a significant driver of donation behavior, whereas risks related to poverty are not significant (see Table 2, columns 2 and 3 respectively). Remarkably though, once risk perceptions on the different topics are jointly considered, the perception of Covid-19-related risks is no longer significant, and the climate risk perception is the only significant (see Table 2, column 4).

Table 3 shows that, against our basic premise, once risk perceptions, actions, and motivations are considered jointly, actions associated with the three different topics are the only significant drivers of donation behavior in all topics, whereas risk perceptions are not. This holds true when considering each topic separately (Table 3, columns 1–3) as well as when considering all topics together (Table 3, column 4). In addition, motivations regarding Covid-19 and poverty are statistically significant when considering each topic separately ($p < 0.05$, Table 3, columns 1–3), but non of the motivations are significant when considering all topics together (Table 3, column 4).

Table 2
Tobit regressions of total donations on participants' risk perception regarding the Covid-19 pandemic, the climate crisis, and poverty (with €0 and €3 as lower and upper limit, respectively). All independent variables are *z*-standardized. Robust standard errors are provided in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

	(1)	(2)	(3)	(4)
Covid-19: Risk perception	0.273**			0.193
	(0.097)			(0.100)
Climate: Risk perception		0.358***		0.306**
		(0.098)		(0.103)
Poverty: Risk perception			0.147	0.005
			(0.097)	(0.099)
Constant	2.647***	2.648***	2.651***	2.646***
	(0.101)	(0.101)	(0.101)	(0.100)
Observations	879	879	879	879
Pseudo R^2	0.003	0.006	0.001	0.008

Table 3
Tobit regressions of total donation on participants risk perception, actions, and motivations regarding the Covid-19 pandemic, the climate crisis, and poverty (with €0 and €3 as lower and upper limit, respectively). All independent variables are *z*-standardized. Robust standard errors are provided in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

	(1)	(2)	(3)	(4)
Covid-19: Risks	0.019			0.008
	(0.108)			(0.107)
Covid-19: Actions	0.349**			0.240*
	(0.111)			(0.110)
Covid-19: Motives	0.332**			0.211
	(0.114)			(0.123)
Climate: Risks		−0.030		0.023
		(0.125)		(0.125)
Climate: Actions		0.518***		0.411***
		(0.114)		(0.122)
Climate: Motives		0.258		−0.031
		(0.134)		(0.156)
Poverty: Risks			−0.142	−0.104
			(0.108)	(0.106)
Poverty: Actions			0.484***	0.260*
			(0.116)	(0.120)
Poverty: Motives			0.244*	0.101
			(0.124)	(0.144)
Constant	2.633***	2.630***	2.635***	2.620***
	(0.099)	(0.099)	(0.100)	(0.098)
Observations	879	879	879	879
Pseudo R^2	0.017	0.022	0.017	0.033

We also analyze the short-term time evolution of survey responses during the 8 weeks of the study (see Fig. S2 in the Supplementary Material). The same way that we did not see a clear time trend in the donations to the different charities, we do not observe a systematic decrease in participants' risk perceptions, actions, nor motivations related to the Covid-19 pandemic for the eight weeks of our study. Similarly, there is no monotonic pattern on the impact of perceptions, actions nor motivations on donation decisions (see Figs. S3–S4 in the Supplementary Material).

4. Discussion and conclusion

The results of this study are consistent with a partial substitution in donations to other social causes after the emergence of the Covid-19 pandemic. Measuring donations to eight charities, covering diverse social concerns, we see that donations to these charities significantly decrease when the *Covid-19 Solidarity Response Fund* is a possible recipient as compared to when it is absent. Thus, we find support for a partial substitution from donations to other charities to the *WHO Covid-19 Fund*. This substitution effect derives from aggregate donations (including the eight charities and the *WHO Covid-19 Fund*) remaining stable, while donations to the *WHO Covid-19 Fund* being positive. Contrary to the previous literature on requests for support for humanitarian crises or natural disasters, aggregate pro-social behavior after

[2] Feed-back from the participants at the end of the activity provides anecdotal evidence that answering the questionnaire made them reflect on the interrelation between the thee topics of Covid-19, climate change and poverty, and that there was a time sensitivity of their perception of the interrelation between these three big topics: For example "… I myself would normally have described myself as very open to refugees, and my political views have also been very concerned with climate change for a while. Since the beginning of this Corona crisis, my thoughts seem to have become more limited to this issue. Issues like climate change or refugees suddenly seem secondary because Covid-19 is something that affects health and can really affect everyone psychologically in some way as well. The consequences of climate change or even the refugee crisis are not as tangible at the moment as the problem of Covid-19…" Similarly, another respondent shared "'…especially due to the media's handling of the Covid-19 issue, other topics such as environmental protection and poverty hardly have a public platform anymore." And yet another "…In the questions about changed behavior due to climate change concerns, some will probably indicate changed behavior, but it is more likely to be related to Covid19…". Or also "I like that you also included climate change as a hot topic. Since almost no one has taken the issue of climate change seriously until now. And that threatens the world much more than a corona virus…"

incorporating the *WHO Covid-19 Fund* does not significantly increase. Indeed, we observe an insignificant *decrease* in aggregate donations. This result is also contrary to the previous literature on competition between charities, that would support an increase in total donations by increasing the number of possible recipients from eight in *Baseline* to nine in the *Covid-19* treatment. The partial substitution effect that we report is closer to previous evidence on the changes in donation patterns after experiencing oneself a health problem. Black et al. (2020) show that an adverse health shock (e.g., stroke, heart attack, cancer) substitutes donations to other social concerns towards health-related charities.

Our results also show that the possibility of donating to a Covid-19 specific recipient collects substantial funds to that cause. This illustrates a high degree of concern about Covid-19 among participants in our study, making pro-social efforts to support those in need because of the pandemic. When the *WHO Covid-19 Fund* is the only possible recipient, donations account for more than half of the endowment. Yet, when considering Covid-19 concerns among the menu of social concerns, donations to the *WHO Covid-19 Fund* go down to 9.5% of endowment. This suggests that subjects also care about other social concerns and, when given the chance, distribute donations among several charities accordingly. In sum, our results indicate that donations to diverse social concerns are partially substituted by donations to the Covid-19 fund; yet, this substitution is far from fully replacing all other social concerns.

We also show that risk perceptions on the Covid-19 pandemic and climate crisis explain part of the variation in individual donations. However, these effects are no longer significant when including actions and motivations on the Covid-19 pandemic, the climate crisis, and poverty: Action on each of these topics turn out to be stronger drivers of aggregate donation behavior.

We interpret our results as illustrating society's desire of keeping up the support for climate action and poverty alleviation jointly with fighting the direct and indirect consequences of the Covid-19 pandemic. This is consistent with the supranational policy for charitable action that was set during the Spring of 2020. For example, the *UN Sustainable Development Goals* have maintained their support in improving the living conditions of those less fortunate in society and for a healthier environment. During the course of our data collection (April and May, 2020), the United Nations have actually explicitly introduced the Covid-19 relation to each of the *UN Sustainable Development Goals*, highlighting the interrelation of the pandemic, economic well-being, and environmental conservation.

Nevertheless, the balance between the different social priorities in the international and national policy agenda is not yet defined. Mitigating the coronavirus pandemic is argued to be a less complex collective action problem than the climate crisis, where the distance between action and the effect of implemented measures is smaller (Harring et al., 2021). This might be one of the reasons behind governments' quick and substantial investments in Covid-19 recovery funds during the course of the pandemic, while current climate commitments remain largely insufficient (e.g. Höhne et al., 2020). For example, Andrijevic et al. (2020) argue that only a fraction of the globally pledged Covid-19 recovery funds until the fall of 2020 would enable the world to keep on track with the goals of the Paris Agreement. Similarly, Dobson et al. (2020) estimate the present value of the costs associated with preventing deforestation and wildlife trade (among others) for 10 years at around 2% of the estimated costs of the Covid-19 pandemic.

As a response, the scientific community has been repeatedly calling for post-Covid-19 policy design to improve the relation of our economies with the natural environment and tackling inequalities (Hodges and Jackson, 2020; Rosenbloom and Markard, 2020; Thorp, 2020; Braun et al., 2020). Particular warnings have been against short-term rescue funds leading to further lock-ins to a fossil-fuel based world economy. Yet, large amounts of the global fiscal stimuli have so far been supporting the fossil fuel sector, as opposed to greener energy sources (e.g. as of August 2021, G20 countries have committed around USD 297 billion supporting fossil fuel energy, see https://www.energypolicytracker.org/region/g20/). Dibley et al. (2021) emphasizes the threat of countries not disclosing climate-related risks in their Covid-19 borrowing, and how "these spending patterns could create a vicious cycle of Covid-19 debt, climate impacts and credit risks" (Dibley et al., 2021, p. 187), with strong implications especially for less wealthy countries. In sum, decision-makers urgently need to understand the global pandemic-response spending as either a threat to climate change or an opportunity to achieve a net-zero energy economy (Shan et al., 2021).

We share the worries of these authors and claim for a governance of economic activity that enhances human well-being, sustainability, and justice and add to this discussion by showing people's diversified social concerns to alleviate the Covid-19, protect the environment and for pro-poor support. In showing the interaction of Covid-19 requests for funds to other social concerns, we aim at providing cumulative information on the social acceptability of public policies to 'build back better'. We do not see a radical reduction in the social concerns to environmental or pro-poor causes. We see participants still caring largely for these topics. We call for further research analyzing the social acceptability of sustainable policies to transform our economies to enable greener, fairer societies. In order to hold governments accountable for using Covid-19 recovery funds in a green & sustainable way (in line with Dibley et al., 2021), we need empirical evidence for its social support. We endorse the view (see also Coyle, 0150) that future research would benefit from multidisciplinary efforts to advance towards integrative rather than cumulative research from different disciplines. Such research effort would enable the community to aid policy-making during the challenging times of the Covid-19 pandemic, in line with the United Nations' (*UN*) *Sustainable Development Goals*, understanding sustainability as integrative of diverse social objectives.

Funding

Funding was provided by FWF (No. P 32859).

Data and materials availability

All data and materials are available at https://osf.io/kgr74/.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We thank all the participants in the sessions for their time and generous donations to the charities. We also thank Tobias Trojok for assistance in developing the questionnaire. We thank Loukas Balafoutas, Ivo Steimanis, Björn Vollan, and James M. Walker for their discussions and comments on previous drafts of the manuscript.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ecolecon.2021.107259.

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